URINARY TRACT INJURIES FOLLOWING OBSTETRIC AND GYNECOLOGIC SURGERIES -A PROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL.

General Surgery

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ABSTRACT

Purpose: Urinary tract injuries occur frequently during surgery in the pelvic cavity. Inadequate diagnosis and treatment may lead to severe complications and morbidities. This study examined the clinical features of urologic complications following obstetric and gynecologic surgery and their management. **Materials and Methods:** We prospectively analysed 14,678 obstetric and gynecologic surgery cases from May 2015 to May 2019. Twenty-one patients with urological complications were enrolled. This study assessed the etiology and surgical approach, type, and treatment method of the urologic injury. **Results:** Of these 21 patients, 11 had bladder injury, 1 had ureteral injury, 1 had combined bladder and ureteral injury, 8 had vesicovaginal fistula and 5 had ureterovaginal fistula. With respect to injury rate by specific surgery, radical hysterectomy was the highest with 5 of 21 cases. Out of 11 cases of bladder injury, only one underwent laparoscopic bladder repair and the rest had transabdominal primary repair during surgery with a 100% success rate. Two of 7 ureteral injuries were identified intraoperatively. One underwent ureteroureterostomy and another had ureteroneocystostomy with no major complications. All 8 cases of vesicovaginal fistula had open transabdominal O'connor repair and all 5 cases of ureterovaginal fistula were cured after ureteroneocystostomy following percutaneous nephrostomy. **Conclusions:** Urinary bladder injury was the most common urological injury during obstetric and gynecologic surgery, followed by ureteral injury. The types of injured states, diagnostic difficulty, and time to complete cure were much greater among patients with ureteral injuries. Early diagnosis and necessary urologic intervention are important for better outcome.

KEYWORDS

Gynecologic surgical procedures; Iatrogenic disease; Urinary tract; Urinary fistula.

INTRODUCTION

Due to the close proximity of female genital and urinary tracts, injuries to the later are common during pelvic and gynecological surgeries. The risk of injury increases when the normal anatomy is altered by primary pathologic factors, pelvic adhesions or when it is difficult to identify the anatomical structures intraoperatively due to severe bleeding. It is estimated that urinary tract damage constitutes 0.2 to 1% of all pelvic operations and gynecologic procedures.¹

Urinary tract injuries following obstetric and gynecologic procedures can be divided into two categories: acute complications such as bladder and/or ureter lacerations that can be identified and repaired immediately during the operation, and chronic complications such as vesicovaginal fistula, ureterovaginal fistula, and ureter stricture, which can occur days to months after primary surgery.

The incidence of clinically apparent ureteral injuries ranges from 0.2% to 2.5% for routine gynecologic operations and 10–30% for all radical procedures for malignant cases.²

Nowadays, urologists are treating these complications with complex minimally invasive cystoureteroscopic and laparoscopic procedures.

This study was performed to investigate the cause and management of urologic complications following obstetric and gynecologic surgery in order to reduce or prevent future occurrences of the same.

MATERIALS AND METHODS

From May 2015 to May 2019, 21 patients with genitourinary injuries following obstetric and gynecologic surgeries were treated in the Department of Surgery at a tertiary care hospital in North East India. Detailed history taking and clinical examination were performed in all these patients.

While analysing, we noted the site of urinary tract injury, its etiologic characteristics, and the type of management undertaken and the success rate of the treatment modality.

Urological complications were grouped as laceration, rupture, transection, or ligation of the ureter found during surgery, urine leak

from vagina after surgery or hydronephrosis during imaging in the post-operative period. Successful repair of the injury was the criterion for successful treatment.

Patients were followed-up in the outpatient clinic at 1, 3, and 6 months with detailed history, physical examination, complete urinalyses, and urine cultures at each visit. Serum creatinine was done at 3 months follow-up. Patients with growth in urine cultures were given appropriate antibiotic therapy. Follow-up intravenous urography or ultrasound was performed 3 months after treatment.

Table 1. Urologic complications following obstetrics and gynecological surgery

Type of surgery	Total number of cases	Total no. of injuries	Site of injury	No. of cases
Radical hysterectomy	10	5 (50 %)	Bladder	4
			Ureter	0
			Bladder + Ureter	1
Total Abdominal hysterectomy	508	1 (0.2%)	Bladder	1
			Ureter	0
			Bladder + Ureter	0
Emergency hysterectomy	18	2(11.1%)	Bladder	2
			Ureter	0
			Bladder + Ureter	0
Vaginal hysterectomy	137	0	Bladder	0
			Ureter	0
			Bladder + Ureter	0
Laparoscopic hysterectomy	5	2(40%)	Bladder	1
			Ureter	1
			Bladder + Ureter	0

LSCS	14,000	2(0.01%)	Bladder	2
			Ureter	0
			Bladder + Ureter	0

Table 2. Primary management of urinary tract injuries

Type of Injury	Type of repair	No. of cases
Bladder	Open Primary repair	10
	Laparoscopic primary repair	1
Ureter	End to end anastomosis	1
Bladder and Ureter	Ureteroneocystostomy	1
Vesicovaginal Fistula	Open transabdominal O'Connor repair	8
Ureterovaginal Fistula	Ureteroneocystostomy	5

RESULTS

Due to the close anatomic proximity of the urinary and female genital tracts, there is predisposition of iatrogenic injuries to the urinary tract during obstetric and gynecological surgery. In our study, Table 1 shows the type of surgery performed and its relation to site of injury and Table 2 shows their management.

The most common type of urinary tract injury was bladder injury, which includes bladder laceration and vesicovaginal fistula. Of the 26 patients, 11 (42.3 %) had bladder injury, each patient (3.8%) had ureteral injury and combined bladder and ureteral injury, 8 (30.7%) had vesico-vaginal fistula and 5 (19.2%) had uretero-vaginal fistula (Tables 1 & 2). Laparoscopic-assisted radical vaginal hysterectomy had one bladder injury which was repaired laparoscopically. The incidence of urinary tract injury in relation to the type of surgery was 19.2 % for radical abdominal hysterectomy, 3.84 % for laparoscopic-assisted vaginal hysterectomy, 3.84 % for total abdominal hysterectomy, and 7.7 % for cesarean section. Out of 11 cases of bladder injury, only one underwent laparoscopic bladder repair and the rest had transabdominal primary repair during surgery with a 100% success rate. Each and every patient had per urethral catheter, which was left indwelling for at least 14 days. Indwelling per urethral catheters were removed only after confirming the absence of extravasation by cystogram. Two of 7 ureteral injuries were identified intraoperatively. One underwent ureteroureterostomy, and another had ureteroneocystostomy performed with no major complications. All 8 cases of vesicovaginal fistula had open transabdominal O'connor repair and all 5 cases of ureterovaginal fistula were cured after ureteroneocystostomy following percutaneous nephrostomy (Table 2). In the case of ureterovaginal fistula, Double J stent insertion or percutaneous nephrostomy were initially performed, followed by ureteroneocystostomy after 3-6 months following the injury.

DISCUSSION

The most common complication of pelvic surgery is urinary tract injury. Its incidence is reported to be from 0.5 to 1.5%, and bladder injury is more common than ureter injury.^{3,4,5} In our study, the incidence of urinary tract injury during pelvic surgery was 0.2%. Of the observed urinary tract injuries, the most commonly encountered injury was in urinary bladder in 42.3 % patients. This suggests that during pelvic surgery, the most common site of urinary tract injury is bladder. The observed high incidence of bladder injury may be due to the fact that bladder injuries are easier to identify intraoperatively than injuries occurring at other sites. The leiomyoma of the uterus was the most common indication for pelvic surgery, and transabdominal hysterectomy was the most common type of surgery performed. Those patients who had a history of previous pelvic surgery or there was a strong suspicion of pelvic adhesion, preoperative stent insertion was done. This makes the identification of the ureter easier, even though it does not make it less prone to injury. However, its reported cost-effectiveness was lower than expected.⁶ The most common sites of ureteral injury during hysterectomy are along the pelvic wall lateral to the uterine artery, the area of uterovesical junction, and the base of infundibulopelvic ligament.^{7,8} This procedure requires special attention during dissection. The timing of repair of ureteric injuries is somewhat controversial, with some urologists advocating immediate repair whereas others favor delayed repair.⁹ It has been argued that recognition and repair of injury at the time of urinary tract injury or within a week of the injury allows for better results with fewer complications.⁹ Injuries which are detected intraoperatively are usually more easily repaired at the time without the need for further

surgical intervention in future. However, it was seen that postoperative diagnosis of ureteral injury and delayed repair had its own advantages and benefits. In this situation, it was easier to find the borders of viable tissues more readily and were able to avoid unnecessary excision. As a result, the rate of bleeding complications was lower and suture tension was reduced.¹⁰

Eight cases of bladder injury presented to us in the form of VVF. This is similar to most series where the most common form of injury is intra-operative detection of urinary bladder laceration and it is treated by primary bladder repair.¹¹

The vesicovaginal and ureterovaginal fistula, which was the most common complication detected after pelvic surgery, originates as the result of urine leakage from the vagina and was sometimes accompanied by fever, flank pain, and chills.¹⁰ Vesicovaginal fistula patients presented themselves to us after a varying period of 4 months to as long as 10 years after primary surgery. There is no consensus about the timing or surgical technique of fistula repair.¹² The classical view is to delay the repair for 3–6 months to allow the inflammation to subside. All patients were treated with transabdominal open repair using O'Connor bivalve technique.¹³

In our series, 5 patients with UVFs were treated with open ureteroneocystostomy using non-refluxing extravesical Lich-Gregoir technique. Of these patients, 2 had open abdominal hysterectomy, another 2 had radical hysterectomy and 1 patient had Debulking surgery for ovarian cancer. These patients presented themselves to us 2–8 weeks after the primary surgery with symptoms ranging from urinary incontinence in 4 patients and urosepsis in one patient. In all the cases, retrograde DJ stenting was tried initially, but because of failure in the process, 4 underwent percutaneous nephrostomy under ultrasound guidance. In all the patients, DJ stent was removed 4 weeks after the repair and voiding cystogram done at 3 months. All the cases were successfully managed.

CONCLUSIONS

This study shows that iatrogenic urinary tract injuries are still common in our practice and gynecologic surgeries cause more injury than obstetric ones. Urinary bladder injury occurred more often than ureteral injury. The varieties of injuries, diagnostic difficulties, and time to complete cure were much greater among patients with ureteral injury. When a urinary tract complication develops, prompt diagnosis and early urologic intervention are necessary to prevent the occurrence of delayed urologic complications.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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